Preliminary Science Flight Report
Operation IceBridge Antarctica 2011

Flight: **F06**
Mission: **Recovery Glacier – Mid Lakes**

Flight Report Summary

Aircraft	**DC-8 (N817NA)**
Flight Number	120110
Flight Request	128008
Date	Thursday, October 20, 2011 (Z), Day of Year 293
Purpose of Flight	Operation IceBridge Mission Recovery Glacier – Mid Lakes
Take off time	11:59:59 Zulu from Punta Arenas (SCCI)
Landing time	23:37:27 Zulu at Punta Arenas (SCCI)
Flight Hours	11.7 Hours
Aircraft Status	Airworthy.
Sensor Status	All installed sensors operational.
Significant Issues	None
Accomplishments	• Low-altitude survey (1,500 ft AGL) Recovery Glacier. Completed entire mission as planned. • Collected data over an ice core site on Berkner Island. • ATM, MCoRDS, snow and Ku-band radars, gravimeter, and DMS were operated on the survey lines. • Conducted one ramp pass (1000 ft AGL) at Punta Arenas airport for ATM, snow and Ku-band radar instrument calibration.
Geographic Keywords	Recovery Glacier, Berkner Island, Reinwarth Höhe, Antarctica
ICESat Tracks	0092.
Repeat Mission	None.

Science Data Report Summary

Instrument	Instrument Operational			Data Volume	Instrument Issues
	Survey Area	Entire Flight	High-alt. Transit		
ATM	☑	☒	☒	37 GB	None
MCoRDS	☒	☒	☒	1.3 TB	None
Snow Radar	☒	☒	☒	200 GB	None
Ku-band Radar	☑	☒	☒	200 GB	None
DMS	☑	☒	☑	71.2 GB	None
Gravimeter	☑	☑	☑	2 GB	None
DC-8 Onboard Data	☑	☑	☑	40 MB	None

Mission Report (Michael Studinger, Mission Scientist)

Today's mission is a new design. The intention is to map the grounding line and lower part of Recovery Glacier using all IceBridge low-altitude sensors. It also includes a flight line specifically targeted over several subglacial lakes, specifically four on the upper part of the glacier's trunk. This is a new area for us and we have been closely studying weather models and satellite images since we arrive in Punta Arenas to get a feeling about the quality of the different forecast models in this area. This morning we saw consistent features in satellite imagery that just came in two hours before takeoff and the models and decided to launch. We got 100% of the survey lines planed in good conditions, although we saw blowing snow on the surface almost the entire time.

The Recovery Glacier is a hard to reach science target and has been long the on list of glaciers that need to be surveyed to get a better mass balance estimate of the East Antarctic Ice Sheet. Very little is known about the bedrock structure and conditions beneath the glacier, that despite its name is actually and ice stream. While crossing the trunk of Recovery Glacier on an ICESat line we saw clear bed reflections across the entire channel on the realtime display of the radar. The upstream end had a surprise for me since the ice there seems to be significantly thicker than on the downstream side. The four subglacial lakes did not show a clear lake reflector on the aircraft, but this needs to be revisited when the processed data become available. Views of the nearby Shackleton Range in the evening sun rounded up the successful mission.

Both, ATM and DMS collected data in cloud free areas over the Antarctic Peninsula, the Bellingshausen and the Weddell Seas from 37,000 ft.The known wildlife colonies in the survey area were at safe distance to the flight path of the DC-8.

Individual instrument reports from experimenters on board the aircraft:

ATM: The ATM lasers worked well and collected good data along the entire survey line.

MCoRDS: The MCoRDS worked well.

Snow and Ku-band radar: The snow and Ku-band radars collected data along the entire line. The pilots did an outstanding job keeping the flight elevation to 1500 ft AGL during the entire survey line, which resulted in good radar data.

Gravimeter: Worked well. No issues.

DMS: DMS worked well. No issues.

DC-8 on board data: System worked well.

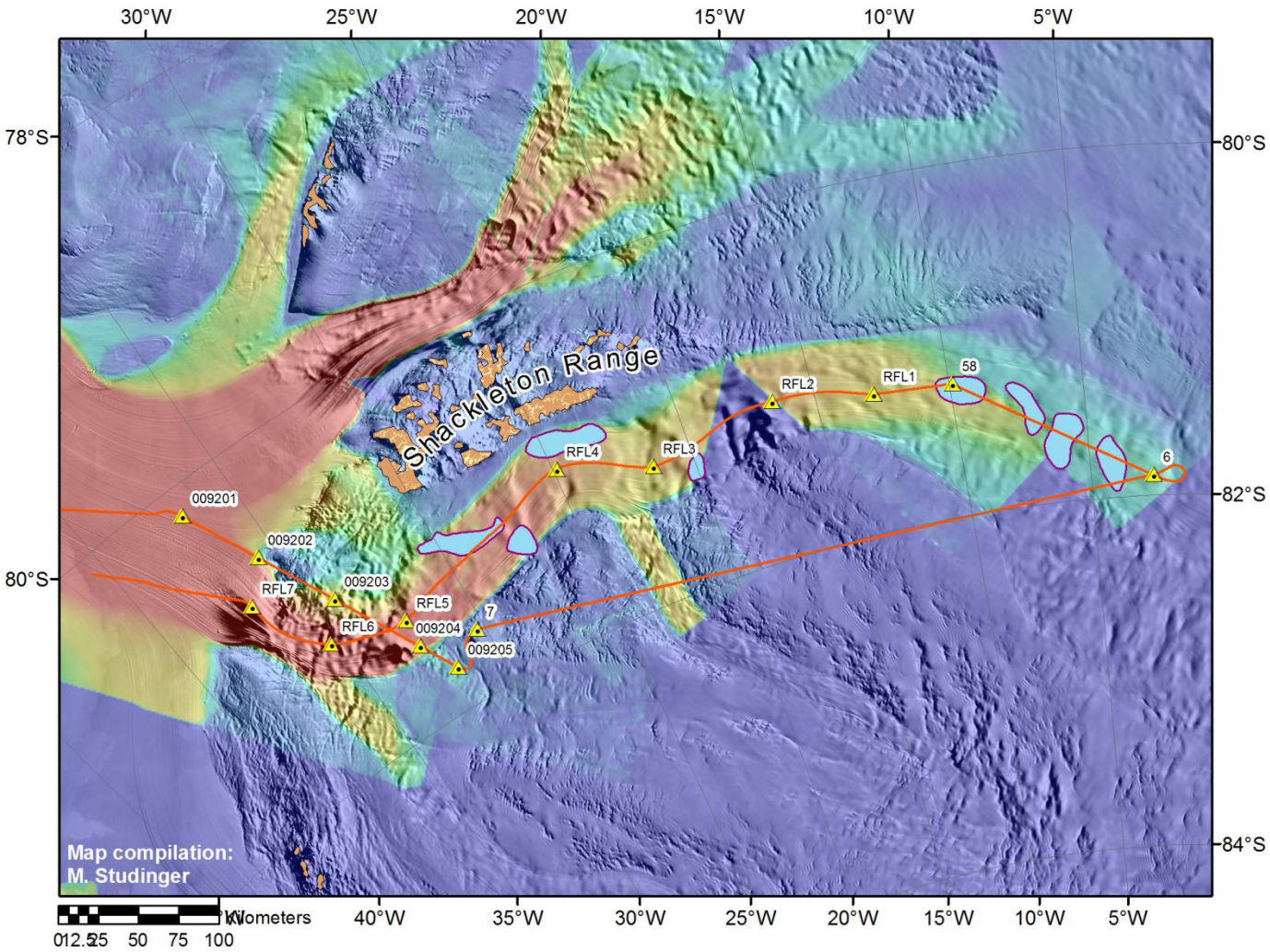

Figure 1: DC-8 trajectory over the Getz Recovery Glacier. Subglacial lakes are indicated by blue outlines. Background image is MODIS mosaic and ice surface velocity from InSAR.